



GRP TANKS



COMPANY PROFILE



SUPERLIT Group Manufacturing Facilities belongs to the KARAMANCI HOLDING established in 1961. Since the beginning of the sixties SUPERLIT has been present in Türkiye market and an international market as a leader of pipe manufacturer supplying their products to 5 continents worldwide.

Superlit GRP products made using the Filament Continues Winding and Helical Discontinues Winding technologies covering diameter range of DN50- DN4000 mm, with a stiffness of 1250, 2500, 5000, 10000 Nominal Pressure Class is 1 – 32 bars and for special design is much higher for both SN & PN.

The Products are corrosion resistant, chemical resistant, and high-resistant in water and sewage applications and light in weight used in the following applications:

1. Clean Water and Potable Water Application
2. Irrigation Application
3. Hydroelectric Power Plant Application
4. Sewer Application
5. Storm Water Application
6. Water Treatment Application
7. Seawater Application
8. Trenchless & Jacking Application
9. Water Tank Storage Application
10. Petroleum Tank Application
11. Chemical Industrial Tank Application

The entire products produce by SUPERLIT are also simple to handle and are manufactured to a high quality in accordance to an international standards such as EN, ISO, ASTM and AWWA. SUPERLIT is the only GRP pipe manufacturer in Türkiye that has 3 different pipe production technologies: Continuous Filament Winding, Centrifugal Casting technology and Helical Filament Winding.

Integrated Management Systems Certificates (ISO 9001, ISO 14001 & ISO 45001) have been granted by the internationally recognized and reputable independent organizations. Being one of the world's leading manufacturers in the pipe industry with an experience of more than half century, SUPERLIT supplies pipes for projects in many different regions around the world from Europe to Africa and from America to Asia and Australia.



PRESENCE IN CONTINENTS



61 YEARS OF EXPERIENCE



3 DIFFERENT PIPE PRODUCTION TECHNOLOGIES



ENGINEERING AND R&D



PROVIDING SITE SUPERVISION



QUALITY MANAGEMENT



ENVIRONMENT FRIENDLY AND SUSTAINABILITY



WIDE FIELD SERVICE

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1. INTRODUCTION

GRP Tank is a composite material produced by combining glass fibre, thermoset resin and silica sand filler depending on the design and application. These products can be used in many different applications areas due to the advantages of the GRP material.

-  Water Tank Application
-  Retention & Detention Tank Application
-  Petroleum & Industries Tank Application
-  Chemical Tank Application

Superlit GRP Tank can be specially manufactured according to the purposes of use and demand of the project. The GRP tanks are manufactured according to the storage conditions such as underground or above ground as well as produced according to the specific application as single or double wall.



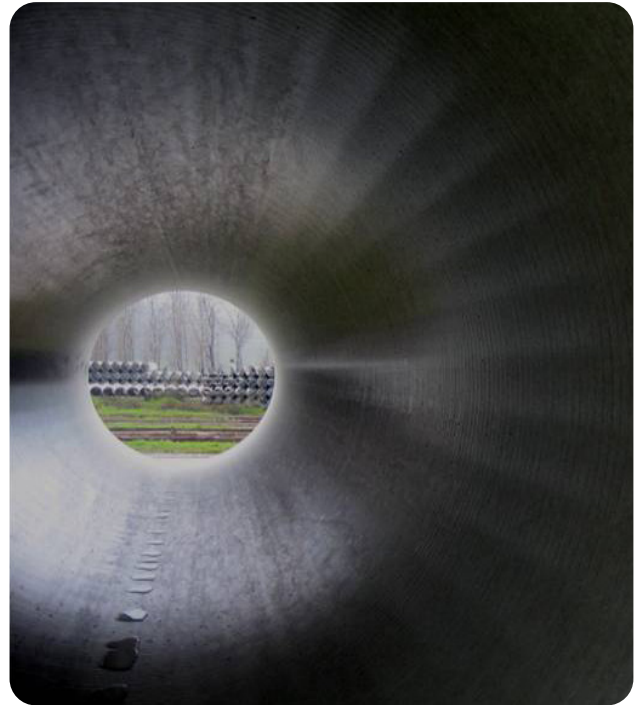
2. ADVANTAGES OF GRP TANK

GRP Tank has become the choice of designer due to the advantages compared to Steel, Concrete and Other type of materials. The advantages of GRP Tank composite materials compared with other materials are listed below:

- ④ Non-corrosive composite structure
- ④ Designed to serve in a wide pH range
- ④ Long service life
- ④ Lightweight
- ④ Strong & Durable
- ④ UV-resistant
- ④ High abrasion resistance
- ④ Leak tightness at all parts.Prevents fluid transfer from both directions (infiltration-ex filtration)
- ④ Free Maintenance

Thanks to the above advantages of GRP materials, tank systems when compared to other materials will provide additional benefits to the project.

- ④ In high volume tank projects, the tank volume can be achieved by extending the tank body length based on project requirement.
- ④ Full-face couplings connection which is superior sealing performance and easy installation can be used for jointing both main tank body lengths.
- ④ Thanks to its superior external load capacity, the GRP Tanks can be installed in various buried depths and this ensures their space availability on ground.
- ④ Low cost compared with traditional tank materials.
- ④ Wide range of accessories
- ④ Fast and easy installation



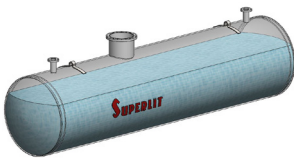
3. TANK MODELS

GRP Tank models can be classified according to their liquid content, structure of body, installation condition and storage condition as shown below.

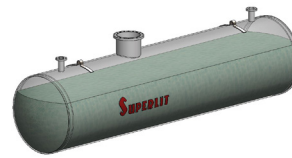
GRP TANK CLASSIFICATION

1. Liquid Content

Water / Potable Water Tank



Chemical / Petroleum Storage Tank

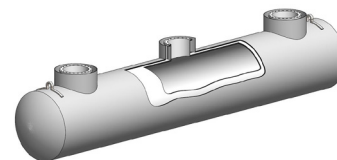


2. Structural Design

Single Wall Tank



Double Wall Tank



3. Installation Condition

Underground Tank

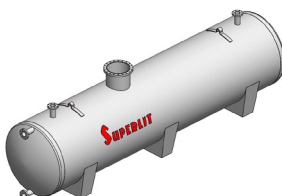


Aboveground Tank



4. Storage Condition

Horizontal Tank



Vertical Tank



4. APPLICATIONS

4.1 Clean Water and Potable Water Application

GRP tank systems have an important place in keeping water fresh & healthy conditions due to its thermal and chemical properties.

Superlit GRP WaterTank provide large amount of water storage and advantages with their superior properties such as no timescale deposits nor sediments, high strength, resistant against corrosion (no need cathodic protection or any additional isolation materials) etc...

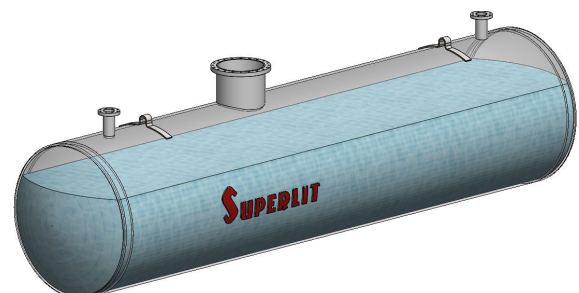
The first point to consider in potable water systems is to ensure that the supplied water is not exposed to a modification that may be harmful to health. GRP pipes & tank do not get corroded and can be used in potable water systems with confidence and due to these properties it can be considered as Green Product.

Since the thermoset resin is completely cross-linked, it is not possible for potable water and resin to initiate a new bond chemically. This property prevents any chemical substances transfer between structure and fluid. In addition to that the composite structures will not be affected from standard chemical additives (like chlorine) which normally mixed with the water for hygiene purposes.

Superlit GRP Potable Water Tank, Pipe and Fittings are certified by the Water Regulations Authorities by WRAS & NSF

Product Benefits:

- ④ Permanent drinking water quality – Thanks to full corrosion resistance, drinking water quality does not deteriorate.
- ④ Due to smooth internal surface, no accumulation of dirt and moss
- ④ Resistant against corrosion
- ④ Lightweight
- ④ Fast and easy installation.
- ④ Suitable for custom design upon any project requirement.
- ④ Resistant against UV radiation.



4.2 Retention & Detention Tanks for Storm & Rain Water Application

The retention tank Systems are made to harvest both storm water and/or rainwater to retain it rather than let it flow off. The many uses for collected rainwater can be used in many areas such as irrigation purposes, flushing toilets, filling pools, carwash etc. Tank capacity can be designed specially according to the purpose of use such as collecting the rainwater from individual house roofs or collecting storm water from a wide region.

Global warming increases the importance of water resources.

Retention tank systems produced by Superlit provide storing rain/ storm water and help water sustainability.

Detention tank systems are the fast and cost effective way to increase the capacity of the drainage system when compared with upgrading/building new pipelines. The tank can be easily adapted to the present network system and reduce the overload in peak hours. Huge amount of water is separated from the pipe network and stored out of the system to prevent flood.

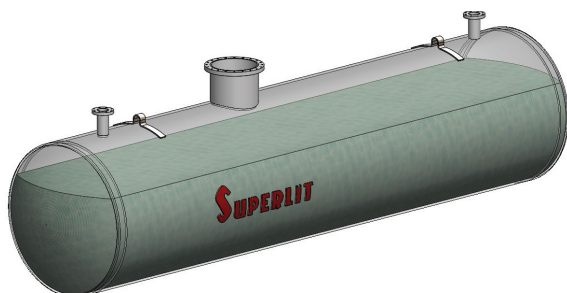


4.3 Petroleum Tank Application

GRP Petroleum Tank are one of the most used storage options like in many areas due to the advantages of the composite that are now accepted worldwide such as corrosion resistance, lightweight, long life, wide pH range, low maintenance cost etc.) Superlit GRP petroleum tank offers suitability for a wide range of petroleum-based chemicals.

Product Benefits:

- ④ Equipped with special resin types used in designing the tank depends on the project requirements
- ④ Low cost of management and free maintenance.
- ④ Leak tight system
- ④ Does not conduct electricity; resistant against acid, base and salt attacks.
- ④ Fully resistant against corrosion internally and externally.
- ④ It is possible to produce designs of complex structures



Possible Tank Production Models:

- ④ Single Wall or Double Wall
- ④ Underground or Aboveground
- ④ Horizontal or Vertical

Tank Capacity:

Tank can be manufactured in various from DN1000 to DN4000 diameters. The desired volume can be provided according to the project requirements.

4.4 Chemical Industrial Tank Application

GRP Chemical storage tanks which are manufactured custom made are safe and clean solution to store wide range of chemicals. Depending on the type and temperature of the chemicals to be stored, these tanks can be customized.

Chemical storage tanks can be applied both aboveground and underground applications as single or double wall in a variety of chemical concentrations and temperature ranges.

Superlit GRP storage tanks have a very high corrosion resistance. The corrosion resistance of the tank depends, in addition, on the resin selection, the temperature of the media and the concentration of the chemical(s) contained in the media.

Tanks are suitable for the respective chemical in higher concentrations and elevated temperatures with resin selection.

The chemical resistance guide in Annex-A, focusing on chemical resistance has been prepared as a general guide only, and the information given should not be used as a design guide in isolated conditions.

Product Benefits:

- ④ Safe and clean storage for hazardous and corrosive chemicals.
- ④ Excellent sealing and insulation performance.
- ④ Design flexibility for a wide range of temperature and chemical types.
- ④ Does not conduct electricity; resistant against acid, base and salt attacks
- ④ Resistant against corrosion both internally and externally.
- ④ Low cost of management and maintenance.
- ④ It is possible to produce designs of complex structures
- ④ Equipped with special resin types used in designing tank especially depends on project requirements.

Possible Tank Production Models:

- ④ Single Wall or Double Wall
- ④ Underground or Aboveground
- ④ Horizontal or Vertical



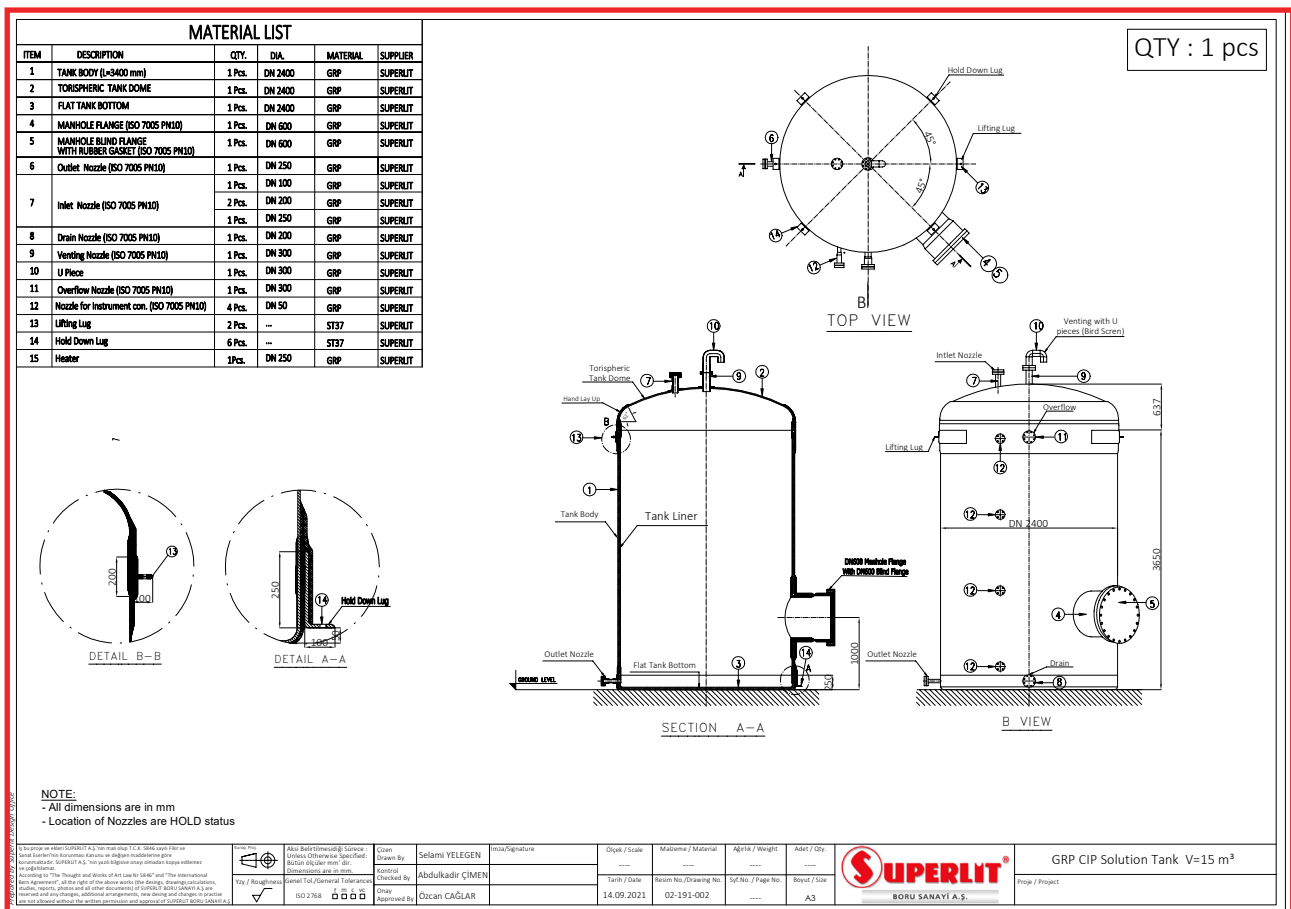
Tank Capacity:

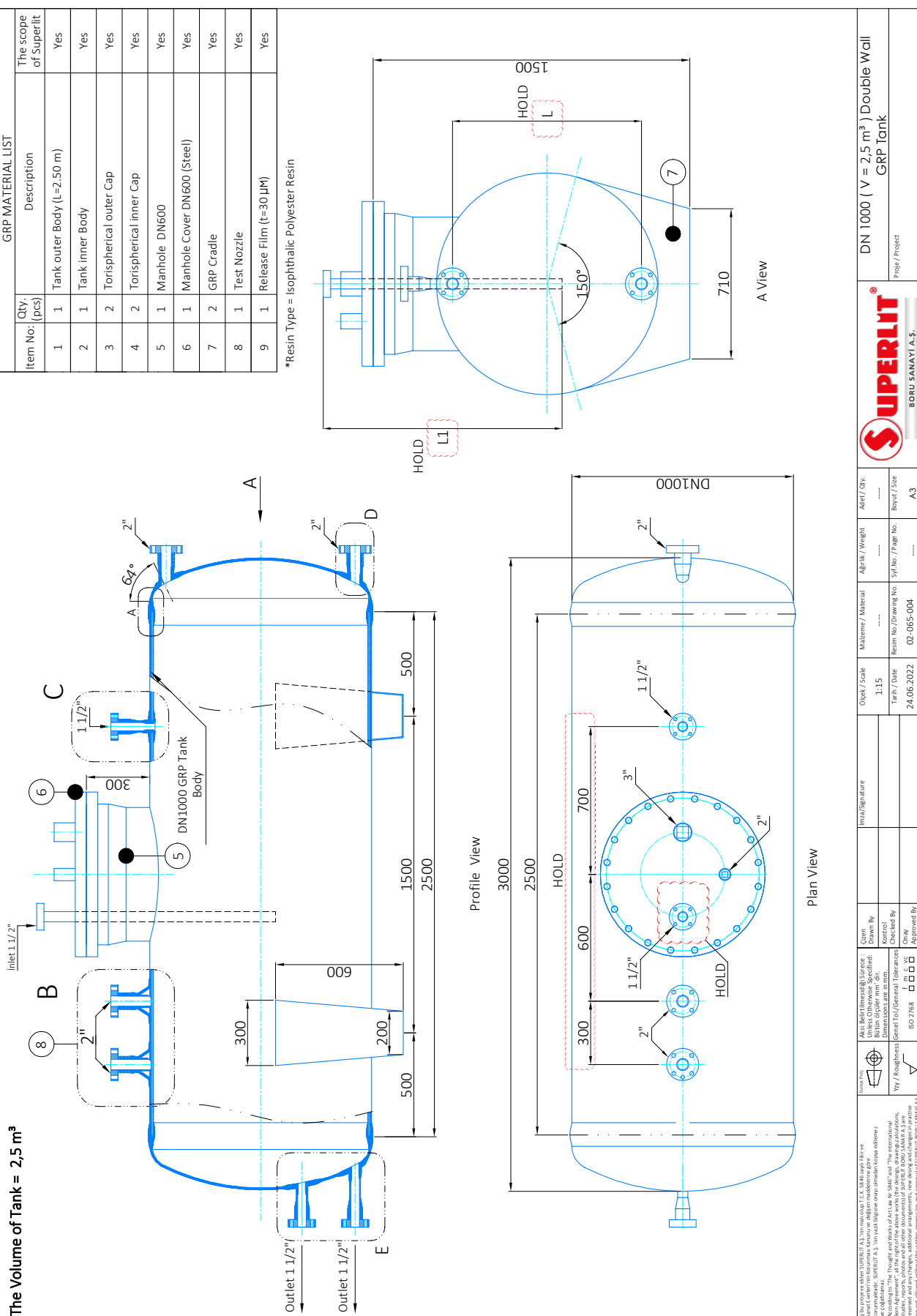
Tank can be manufactured in various from DN1000 to DN4000 diameters. The desired volume can be provided according to the project requirements.

5. DESIGN & ACCESSORIES

5.1 Design of Tank

The tank body is manufactured by the Continuous Filament Winding and Helical Discontinuous Winding processes using glass reinforcements in combination with resin and filler. Continuous Filament Winding technology is the most general and effective way of glass reinforced composite pipe production. Production unit of this process is a composition of mechanics and chemistry. Raw materials of tank body are poured on this mandrel and these materials form a layered structure on mandrel while forming a continuous production process on the axis of mandrel. Layered structure of materials passed through the curing process unit and heaters at the end of mandrel to formed the RM.





Single Wall Tank Body Layers:

Internal liner (1) : The internal liner is a resin rich layer forming the interior layer of the tank to give high corrosion resistance. This layer is reinforced with E or ECR glass fiber and a suitable type of polyester or ECR surface tissue. Liner thickness can be varied upon project requirements.

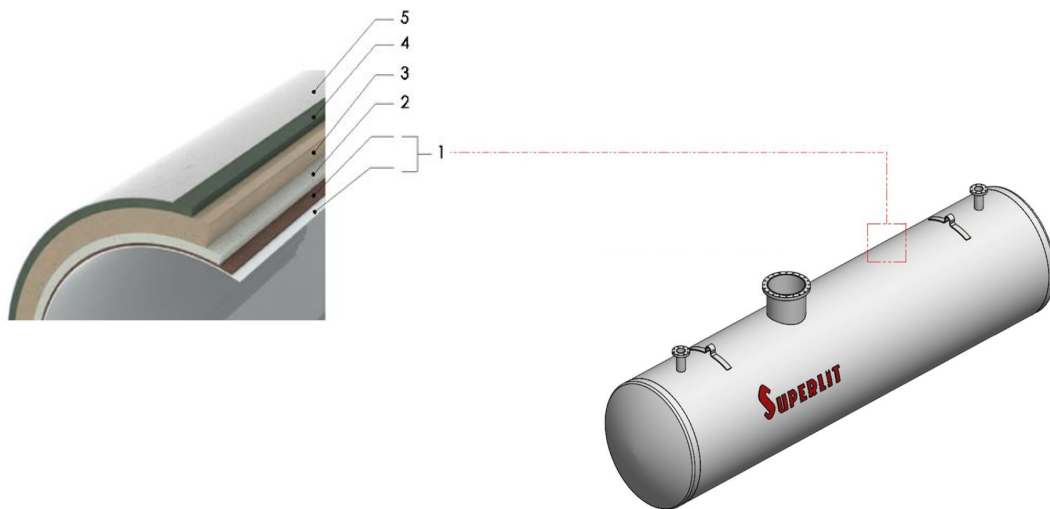
Structural layers (2&4) : The structural layers consist of glass reinforcement and a thermosetting polyester resin, without filler. The structural wall is reinforced with closely spaced continuous fiberglass filament winding, chopped roving, all impregnated in thermosetting resin. The composition of structural layer depends on pressure and stiffness requirement in general.

Core layer (3) : This layer consists of glass reinforcement, thermosetting polyester resin and filler depend on project requirement that are included to provide the required stiffness characteristics.

External layer (5) : The exterior resin rich layer of the pipe is reinforced with surface tissue.

Painting: The outer surface of the tank can be painted according to the project requirements. Requested warning signs & labeling can also be marked.

The necessary static and dynamic calculations that required of GRP Tank can be performed by Superlit Design Team.



Double Wall Tank Body Layers:

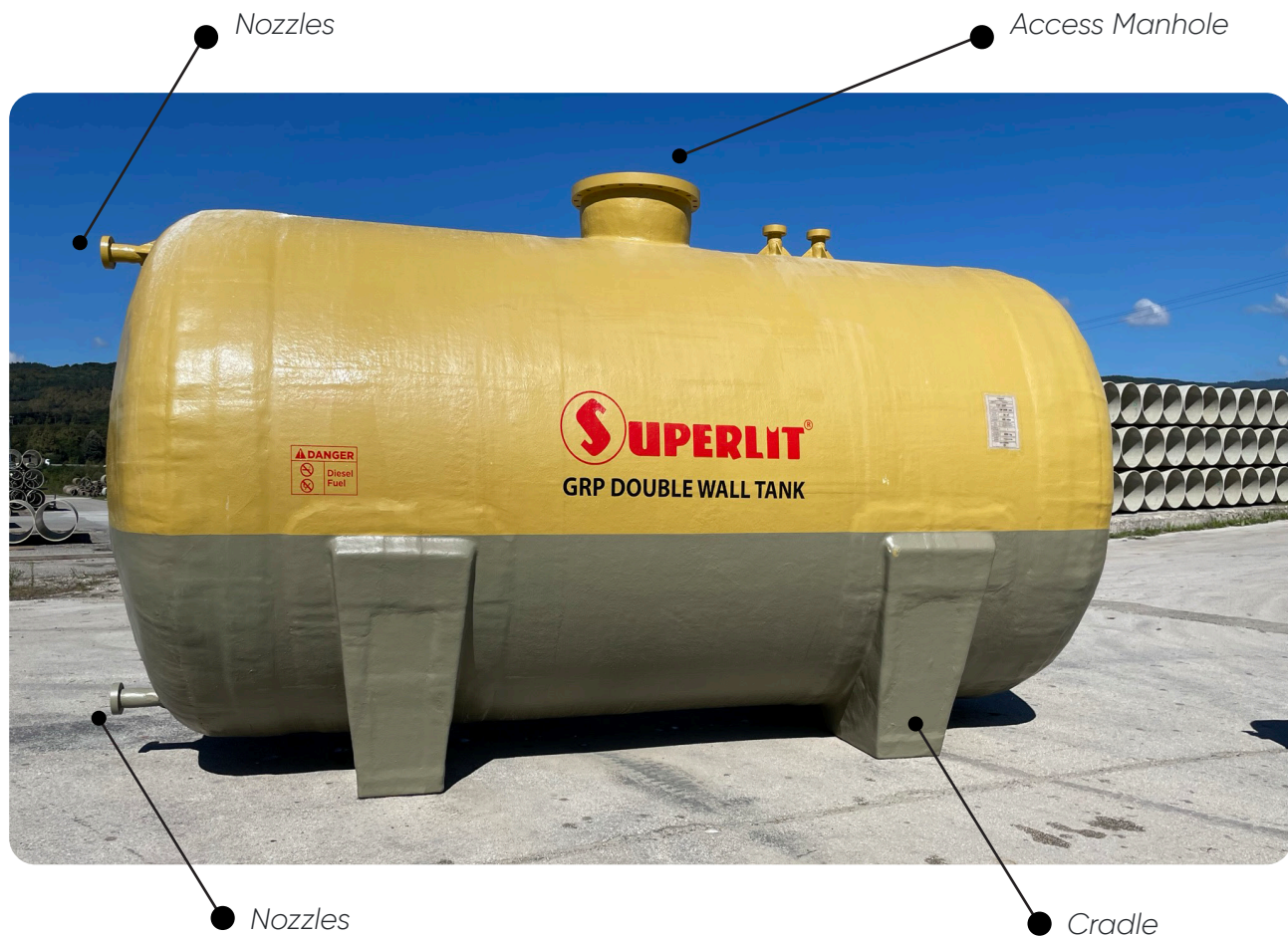
Since the petroleum fluid is valuable and it is likely to contaminate environment, it is essential to design petroleum tanks with double wall structures including special leak detection system between two wall to prevent environmental pollution, environmental damage and to avoid from the high amounts of charges required to compensate the damage caused.

Double wall produced with two main structures (SHELL) with interstitial gap. Layer composition of the Inner shell wall is same as with single shell wall construction detailed above and additional composite external wall constructed over the first inner shell structure. A gap is created between two shells depending on the leak detection system design and project requirements.

5.2 Accessories

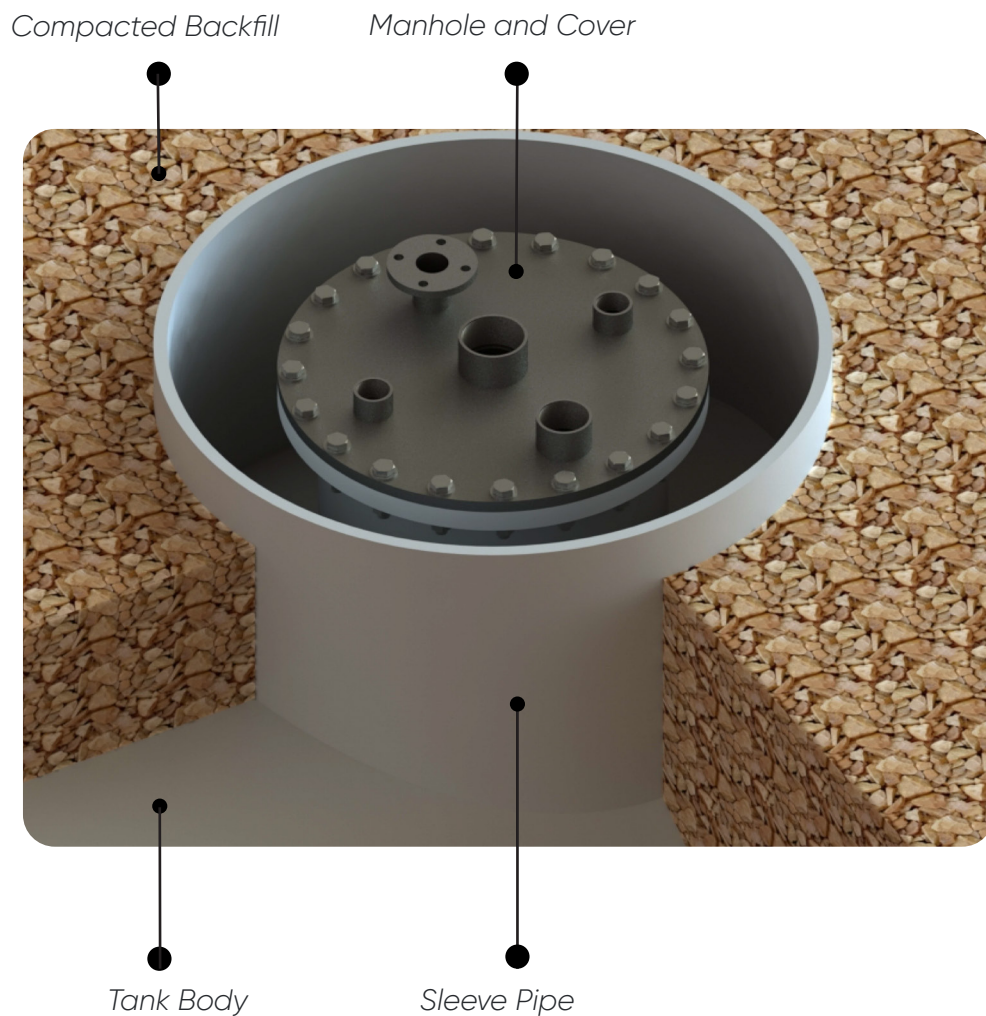
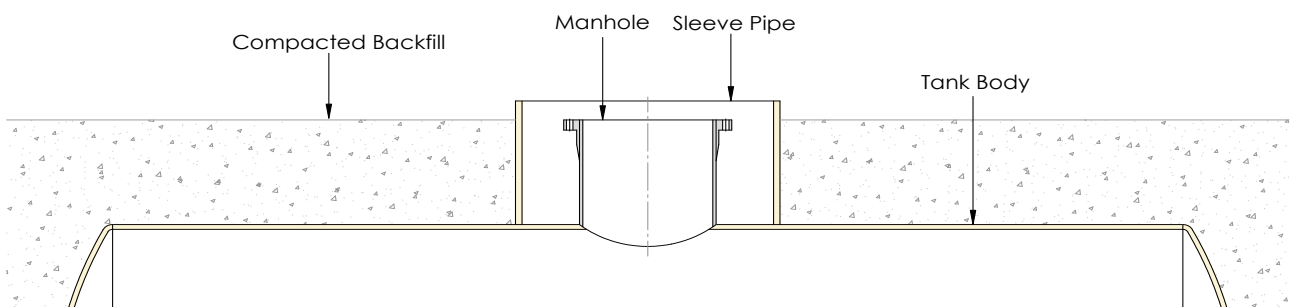
There are various available accessories options depending on the project and design requirements and/or client's preferences including but not limited to ;

- ⑤ Access Manholes
- ⑤ Nozzles (Inlet, Outlets and Vents)
- ⑤ Ladder (SS 304, SS 316, GRP, Aluminum)
- ⑤ Metallic or GRP Blind Flange for Manhole and Nozzle
- ⑤ Lifting lugs
- ⑤ Cradles for Above Ground Application



5.3 Access Manholes

A manhole branch can be located any area on the tank body requested by client. A hole is cut on the required location of tank and manhole pipe is connected with GRP lamination.

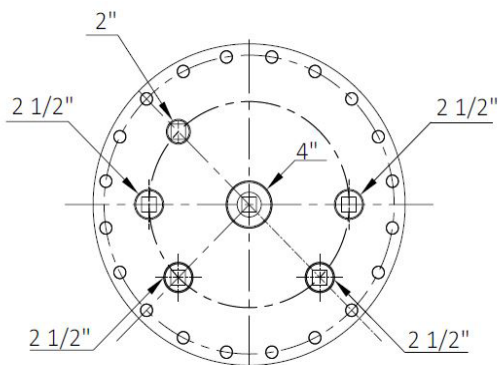
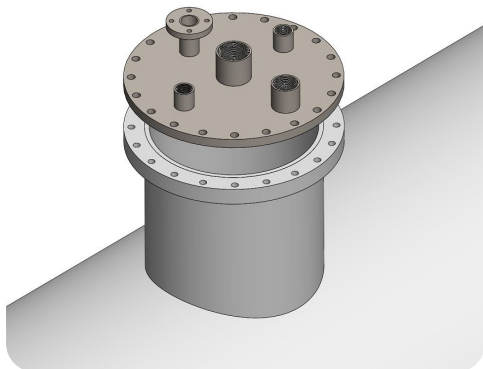


5.4 Nozzles

Each nozzle is assembled on tank by using a lamination. Flanged, spigot and blind flanged ends can be provided up on requirement. Number and location of nozzles can be specially designed as per project needs. Drilling is made as per ISO 7005-1 PN10 standard dimensions or client specification. Nozzle diameters can start from DN50 and PVC branch connections can be provided in case of any requirement.

5.5 Blind Flange

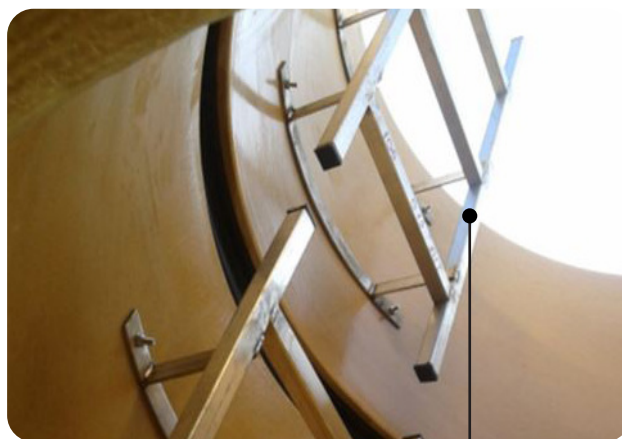
Blind flanges can be supplied for manholes and/or nozzles. Drilling is made as per ISO/EN and ASTM/AWWA or client specification. Blind flanges may be supplied from metallic or GRP materials.



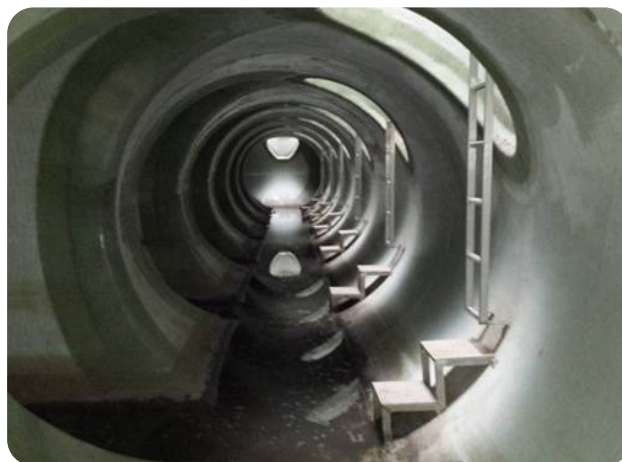
5.6 Ladder

Ladders are integrated elements that allow access to the manhole base. The material of the ladder depends on the designer's requirements. Local regulations should be followed if there is a specific requirement on ladder material. Generally, non-corrosive materials are selected in design as stainless steel (with SS 304 or SS 316 grades).

GRP ladders, aluminum or coated steel ladders are also available upon request. Ladders are bolted to the shaft and bolts are sealed with GRP lamination from the outside of the manhole in order to prevent water transition inside the manhole structure.

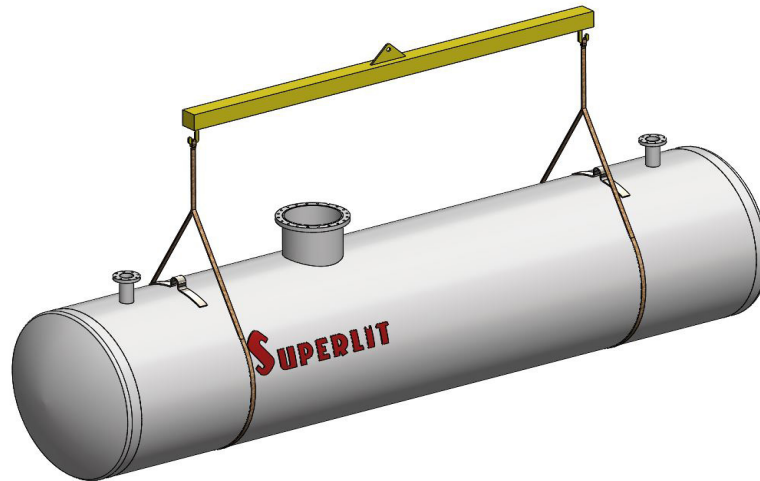


● Ladder



5.7 Lifting Lugs

During tank handling and installation operations, fabric textile straps must be used. As general information, steel cables or chains that can damage GRP surface are not allowed. Steel lifting lugs are alternative accessories fabricated over tanks in order to help handling and installation operations.



5.8 GRP Cradles

Since aboveground tanks does not being buried or covered with soil like underground tanks, grp cradles is the solution to stabilize the tank over the ground and provide support for above ground tanks.

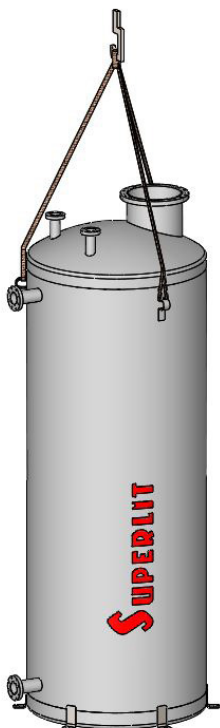


6. INSTALLATION OF TANK

This chapter gives brief information regarding the installation steps of tank. There may be other national or local construction codes involved in a specific project, and client has to consult manufacturer when there is a conflict between these parties.

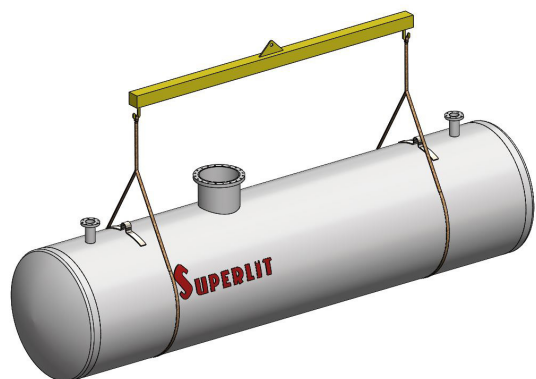
6.1 Handling

During the offloading of tank, lowering tank to the trench or positioning to the installation area textile straps must be used. All lifting slings and connection elements must be free from damages and have to be adequate in handling the tank weight. It is not allowed to use steel cables or chains directly in contact with GRP material which can cause damage in GRP material surface. If GRP tank has lifting lugs, all lifting points have to be used with equal force distribution. Chains and steel cables can be used when there are lifting lugs on the tank, and when they are not in contact with GRP surface.



For the field handling operation the important points below need to be considered:

- ④ Identify proper lifting points and methods
- ④ Visually inspect each product for damages or cracks and report any damage. Damaged goods should not be used unless inspected and repaired by Superlit personnel.
- ④ While loading or unloading and placing tank on the ground, prevent any impact with rigid objects to avoid structural damage.
- ④ Based on tank diameters, lengths and weights, as well as jobsite conditions, crane-lifting strap method or forklift can be used for these operations.
- ④ Tank should not be dropped or rolled, which can cause serious damages.
- ④ Use at least two lifting straps when lifting the tank in horizontal position. Take care about the accessories which can change the center of gravity.

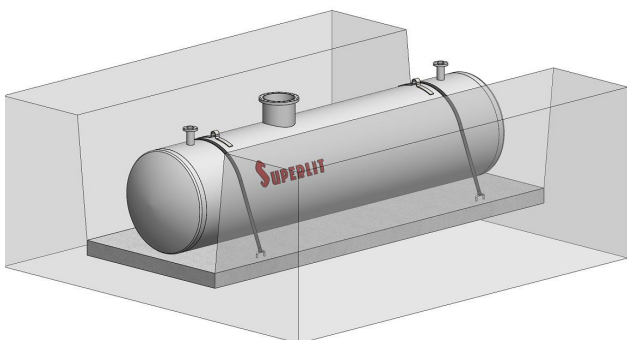


6.2 Storage

If the tank will be unloaded to stock area before installation it is recommended to store goods with original packages.

General requirements of storage area and all related considerations are listed below:

- ④ The storage area should be flat, leveled and clear of objects such as rocks, stones, sharp edges, etc.
- ④ Inlet, outlet branches should not be laid on ground that can cause a damage.
- ④ Horizontal tank shall be laid on horizontal direction above wooden supports if there is not a special cradle on the tank.
- ④ Vertical tank shall be stored vertically, as base unit will be sitting on the ground.
- ④ Precautions have to be considered to prevent goods, from rolling or falling due to wind effects.



6.3 Excavation and Trench Preparation for Underground Tank

GRP TANK installation instructions:.

Following points should be considered during trench excavation:

- ④ Take necessary safety precautions to ensure a safe working environment.
- ④ Prevent water penetration into the trench.
- ④ During excavation, make sure that trench walls should be stable.
- ④ For flat bedding, remove all obstacles and sharp edges such as rocks, gravels, concrete, etc. from the trench.
- ④ Remove all organic items such as plants, tree roots, etc. from trench ground.
- ④ Ensure that trench ground is strong and stable.
- ④ If the trench ground is not stable, reinforced concrete basement may constructed.
- ④ Discharge groundwater (if there is any) from the trench before bedding preparation.
- ④ When the underground water level is high, it might cause tank to float. To prevent floatation, be sure that necessary precautions have been considered.
- ④ Ensure that trench width is sufficient enough for bedding and backfilling compaction works.
- ④ Ensure that excavated materials are piled at a distance from the trench to avoid the possibility of rolling back into the trench.

6.4 Bedding and Backfilling

It is recommended to use granular material for bedding and backfilling zones. Crushed stone, gravel or gravel + sand mixtures can be used.

Trench bedding should be flattened, leveled and compacted all along the trench. Under unstable soil conditions, trench depth and bedding thickness can be increased.

After trench excavation, bedding should be prepared to provide durable and stable support for tank. Bedding should not be less than 15cm in height and should be prepared with compacted granular material at minimum 90% Standard Proctor Density.

For backfill zone, it is recommended to use same material as used in bedding. Same procedures as in standard trench applications shall be applied around the tank. Backfill material should be compacted equally around to prevent movement or tipping of the tank. Larger size of stones are not allowed in bedding

and backfilling zone as in standard practice. The material for the bed, side supports, and cover can be chosen as 3 alternative ways according to ASTM D 4021;

1-) Naturally rounded aggregate with particles that are at least 3.2 mm in diameter and up to 19.0 mm in diameter, and it must be categorized as free-flowing.

2-) Clean, well-graded sand with a maximum particle size of 3.2 mm and no more than 8% fines passing a 200-mesh sieve. Sand should be well compacted to at least 85% of the maximum density as measured by Test Method D 698

3-) An angular material that is free-flowing and clean with particle size not less than 3.2 mm or more than 13 mm in diameter may be used.

For retention tank application gravel size can be higher than recommendation. Please consult Superlit technical team.



7. ANNEX

Superlit Chemical Resistance Guide for Standard and Special Tanks

CHEMICAL	STANDARD	SPECIAL
Acetic Acid		x
Acrylic Acid		x
Alcohol Ethyl	x	x
Alcohol Isopropyl	x	x
Alcohol Methyl Isobutyl		x
Alcohol Secondary Butyl		x
Alun	x	x
Aluminium Chloride	x	x
Aluminium Flouride	x	x
Aluminium Hydroxide		x
Aluminium Nitrate	x	x
Aluminium Potassium Sulfate	x	x
Ammonia Aqueous		x
Ammonia Gas		x
Ammonium Bicarbonate		x
Ammonium Bisulfate		x
Ammonium Carbonate		x
Ammonium Chloride	x	x
Ammonium Citrate		x
Ammonium Flouride		x
Ammonium Hydroxide		x
Ammonium Nitrate	x	x
Ammonium Persulfate		x
Ammonium Phosphate	x	x

CHEMICAL	STANDARD	SPECIAL
Ammonium Sulfate	x	x
Aniline Sulfate		x
Barium Carbonate		x
Barium Chloride	x	x
Barium Hydroxide		x
Barium Sulphate	x	x
Beer	x	x
Benzine Sulphonic Acid		x
Benzoic Acid		x
Cadium Chloride		x
Calcium Bisulfite		x
Calcium Carbonate		x
Calcium Chlorate		x
Calcium Chloride	x	x
Calcium Hydroxide		x
Calcium Nitrate	x	x
Calcium Sulfate	x	x
Calcium Sulfite		x
Cane Sugar Liquid		x
Caprylic Acid		x
Carbon Dioxide	x	x
Carbon Monoxide, gas form	x	x
Chlorine, Dry gas		x
Chlorine, wet gas		x
Citric Acid	x	x
Copper Chloride	x	x
Copper Cyanide		x
Copper Flouride		x
Copper N traie:	x	x
Copper Sulphate	x	x

CHEMICAL	STANDARD	SPECIAL
Crude Oil, sour	x	x
Crude Oil, sweet	x	x
Diesel Fuel	x	x
Ethylene Glycol	x	x
Ferric Chloride	x	x
Ferric Nitrate	x	x
Ferric Sulphate	x	x
Ferrous Chloride	x	x
Ferrous Nitrate	x	x
Ferrous Sulphate	x	x
Flobonic Acid	x	x
Fluosilicic Acid	x	x
Formic Acid	x	x
Fuel Oil	x	x
Gas, natural		x
Gluconic Acid		x
Glucose	x	x
Glycerine	x	x
Heptane		x
Hexane		x
Hexylene Clycol		x
Hydraulic Fluid		x
HydrohSoric Acid		x
Hydroyanid Acid		x
Hydrofluosilicic Acid		x
Hydrogen Bronide, wet gas		x
Hydrogen Chloride, dry gas		x
Hydrogen Chloride, wet gas		x
Hydrogen Sulfide, liquid	x	x
Hydrogen Flouride, vapour		x
Hydrosulfide Bleach		x

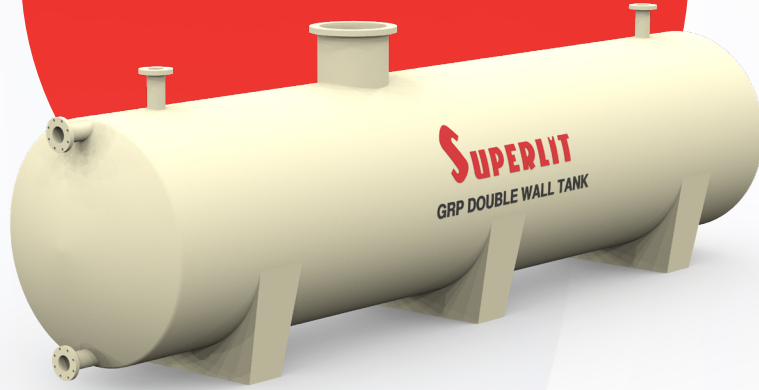
CHEMICAL	STANDARD	SPECIAL
Hydrochlorous Acid		x
Isopropyl Amine		x
Isopropyl Palmitate		x
Kerosene		x
Lactic Acid		x
Laurel Chloride		x
Laurie Acid		x
Lead Acetate		x
Chlorine, dry gas		x
Lithium Bromide		x
Lithium Sulfate		x
Magnesium Bisulfit		x
Magnesium Carbonate		x
Magnesium Chloride	x	x
Magnesium Hydroxide		x
Magnesium Sulfate	x	x
Maelic Acid		x
Mercuric Chloride	x	x
Mercurous Chloride	x	x
Mineral Oils	x	x
Motor Oil		x
Myristic Acid		x
Naptha		x
Napthalene		x
Nickel Chloride	x	x
Nickel Nitrate	x	x
Nickel Sulfate	x	x
Octanoic Acid		x
Oleic Acid		x
Oxalic Acid		x
Perchloretylene		x

CHEMICAL	STANDARD	SPECIAL
Phosphoric Acid	x	x
Phosphorous Pentoxide		x
Phtalic Acid		x
Potassium Alum Sulfate	x	x
Potassium Bicarbonate		x
Potassium Bromide	x	x
Potassium Carbonate		x
Potassium Chloride	x	x
Potassium Dichromate		x
Potassium Ferrocyanid		x
Potassium Hydroxide		x
Potassium Nitrate	x	x
Potassium Persulfate		x
Potassium Sulphate	x	x
Propylene Glycol		x
Salicylic Acid		x
Sebacic Acid		x
Soaps	x	x
Levulinic Acid		x
Sodium Acetate		x
Sodium Aluminate		x
Sodium Benzoate		x
Sodium Bicarbonate		x
Sodium Biflouride		x
Sodium Bisulfate	x	x
Sodium Bisulfite	x	x
Sodium Bromide	x	x
Sodium Chlorate		x
Sodium Chloride	x	x
Sodium Chlorite		x

CHEMICAL	STANDARD	SPECIAL
Sodium Chromate		x
Sodium Cyanide		x
Sodium Dichromate		x
Sodium Diphosphate		x
Sodium Ferricyanide		x
Sodium Ferrocyanide		x
Sodium Flouride		x
Sodium Flouro Silicate		x
Sodium Laryl Sulfate		x
Sodium Nitrate	x	x
Sodium Nitrite	x	x
Sodium Silicate		x
Sodium Sulfate	x	x
Sodium Sulfide		x
Sodium Sulfite	x	x
Stannic Chloride		x
Stearic Acid	x	x
Sugar Cane Liquor		x
Sulfuric Acid	x	x
Tartaric Acid		x
Trichlor Acetic Acid		x
Trisodium Phosphate		x
Vegetable Oils	x	x
Vinegar	x	x
Water, demineralised	x	x
Water, distilled	x	x
Water, fresh	x	x
Water, sea	x	x
Zinc Chlorate		x



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